ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM

Animal Abstract **Element Code:** AFCJB13140
Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Gila purpurea*
COMMON NAME: Yaqui chub
SYNONYMS: *Tigoma purpurea, Squalius purpureus, Leucicus purpureus, Richarsonius purpureus*
FAMILY: Cyprinidae

AUTHOR, PLACE OF PUBLICATION: Girard 1857. Proc. Acad. Nat. Sci. Phila. [1856] 8:165-213.

TYPE LOCALITY: Mexico, Sonora, Rio de San Bernardino, at United States Mexican Boundary, about 29 km east of Douglas, Arizona. Taylor (1967) noted however that collections made during United States and Mexican Boundary Survey were undoubtedly on both sides of present border.

TYPE SPECIMEN:

TAXONOMIC UNIQUENESS: Subgenus *Temeculina* Barbour and Miller (1978). Miller (1945) considered *G. purpurea* related to *G. ditaenia* of Rio de la Concepcion (= Rio Asuncion), Sonora, Mexico, and *G. orcutti* of Los Angeles Plain, California, and associated drainages. One of 5 species of the genus *Gila* in Arizona.

DESCRIPTION: A medium-sized minnow, that is seldom more than 17.8 cm (7.0 in.) long, usually less than 13.0 cm (5.1 in.) (Rinne and Minckley 1991). Head and anterior part of body thickened, thinner posteriorly. Scales large, broadly imbricated, with radii strongly developed on all fields. Scales in lateral line fewer than 59. Dorsal, anal, and pelvic fin-rays eight (rarely seven). Origin of dorsal fin behind insertion of pelvic fins. Pharyngeal teeth 2, 5-4, 2 (Minckley 1973).

Color dark over-all, but usually lighter below. Lateral bands not developed. Vertically-elongated, diffuse, triangle-shaped caudal spot usually present (Minckley 1991).

AIDS TO IDENTIFICATION: Shares traits with Arroyo chub (*Gila orcutti*) including the following characteristics: deep body; deep caudal peduncle. Small, slightly subterminal mouth; short rounded snout; large eye. Differs from Arroyo chub in having a black wedge on caudal fin base.

ILLUSTRATIONS: B&W photo (Minckley 1973:107)
Color photo (Rinne and Minckley 1991:23)
B&W photo (Wildlife Habitat Management Staff Group 1975:146)

TOTAL RANGE: Current distribution in Mexico is unknown. Historically occurred in smaller streams of Rios Matape, Sonora, and Yaqui systems, Sonora, Mexico. Nearly extirpated in U.S., persisting only in one artesian well in San Bernardino Creek drainage (McNatt 1974). Introduced and established in Leslie Creek, Swisshelm Mountains, Arizona, in 1969 (Minckley 1973). Records from Morse Canyon, northern Chiricahua Mountains, Arizona, are not supported by specimens (Willcox Playa basin; McNatt 1974).

RANGE WITHIN ARIZONA: Arizona and U.S. populations limited primarily to the San Bernardino (SBNWR) and Leslie Canyon National Wildlife Refuges, Cochise County. On SBNWR the current distribution of Yaqui chub includes Leslie Creek; House, Twin, North, and Mesquite ponds; Black Draw; and El Coronado Ranch (Turkey Creek and ponds).

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: In the U.S., Yaqui chub are heavily dependent on artesian wells and spring flows on SBNWR.

REPRODUCTION: Spawns in March and young grow to 40.0-50.0 mm (1.6-2.0 in.) SL by following year. Males steely blue during reproductive season, contrasting with drab, yellow-brown of females (McNatt 1974). Rinne and Minckley (1991), indicate that Yaqui Chub breed sporadically throughout the summer.

FOOD HABITS: Foods consist of algae, terrestrial insects, and arachnids in springhead habitats (Minckley 1973), but aquatic insects and small fishes (*Poeciliopsis*) are eaten when available.

HABITAT: Lives in deeper pools of small streams near undercut banks or debris and often in association with dense aquatic vegetation. Also found in swifter areas with clean, gravel bottoms and abundant growths of algae. Historically found in springs, cienegas, creeks, and moderately-sized rivers, which typically had alternating riffles and pools.

ELEVATION: Low to intermediate elevations. Arizona records range from elevations of 3,730 - 4,620 ft. (1138 - 1409 m).

PLANT COMMUNITY: Low, emergent, aquatic plants and hydric-adapted trees such as willows.

POPULATION TRENDS: U.S. populations are low, but apparently stable. Propagated in captivity at Dexter National Fish Hatchery and Technology Center (DNFHTC). Downlisting to threatened status will occur when viable, self-sustaining populations have been established

in San Bernardino and Leslie Canyon National Wildlife Refuges and West Turkey Creek. Delisting is not currently considered an option due to the limited historic distribution. The species also is scarce in the Rio Yaqui basin in Mexico, but is widespread and locally abundant in the small Rio Matape System of Sonora (Hendrickson et al. 1980).

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: LE (USDI, FWS 1984), Critical Habitat established on San Bernardino NWR.

STATE STATUS: WC (AGFD, WSCA in prep)
[State Endangered AGFD, TNW 1988]

OTHER STATUS: No Forest Service Status (USD, FS Region 3 1999)
[Forest Service Sensitive, USDA, FS Region 3 1988]
Listed Endangered (Secretaría de Medio Ambiente 2000)
[Listed Endangered Secretaría de Desarollo Social 1994]

MANAGEMENT FACTORS: **Threats:** aquifer pumping; reduction in stream flows; water diversion; drought; predation by nonnative fishes. Also overgrazing and subsequent erosion has been identified as a threat. **Management needs:** protect San Bernardino aquifers, and Leslie and San Bernardino watersheds to ensure adequate perennial flow; ameliorate effects of nonnative fishes within chub management streams; establish and maintain self-sustaining populations on San Bernardino and Leslie Canyon NWRs, and West Turkey Creek.

PROTECTIVE MEASURES TAKEN: To protect the Yaqui chub from extinction, The Nature Conservancy purchased the San Bernardino Ranch in 1980, and Leslie Canyon in 1988. These parcels were sold to the U.S. Fish & Wildlife Service in 1982 and 1988 respectively, to establish them as National Wildlife Refuges. A draft "Recovery Plan for the Endangered and Threatened fishes of the Rio Yaqui" has been prepared by the U.S. Fish and Wildlife Service and is currently being circulated for review. The plan's primary objective is to stabilize the existing habitats and populations of Yaqui chub in Mexico and the U.S. Critical habitat in Arizona includes all aquatic habitat on the San Bernardino National Wildlife Refuge, Cochise County (1984 Federal Register vol. 49(171)).

SUGGESTED PROJECTS: As identified in the draft Recovery Plan: "1. Develop co-operative effort with Mexico for the recovery of Yaqui fishes. 2. Secure habitat and water sources for the Yaqui fishes in the USA and Mexico. 3. Conduct research on the biology and habitat requirements of Yaqui fishes. 4. Manage the fish and their essential habitats. 5. Introduce and maintain self-sustaining populations within their historic range. 6. Monitor existing and established populations and habitats." Continue to achieve public ownership of suitable habitats and protection of watersheds and aquifers. Cooperation with Mexican authorities is essential to regulate groundwater removal from the San Bernardino valley aquifer in Mexico.

LAND MANAGEMENT/OWNERSHIP: FWS - San Bernardino National Wildlife Refuge; Johnson Historical Museum.

SOURCES OF FURTHER INFORMATION

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MAJOR KNOWLEDGEABLE INDIVIDUALS:

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B.D. DeMarais

ADDITIONAL INFORMATION: The historic distribution of the Yaqui chub was thought to range from the upper Rio Yaqui, west in Sonora to the Rios Sonora and Matape (Minckley 1980). However, in 1991, it was concluded that all chubs but those from the Rio San Bernardino (Black Draw) represented a new species, *Gila eremica* (DeMarais 1991). Yaqui chub were almost extirpated in 1969 when a drought dried up Astin spring in Cochise County, Arizona. Two hundred chub were removed from Astin Spring and were placed into Leslie Creek (Minckley 1973). Stock from these fish were moved into DNFHTC in 1976 and raised at the hatchery. Hatchery produced fish from Dexter were put into the newly established SBNWR in 1980 to supplement stock which were thought to have survived in the well pipe and outflow of an artesian well on the ranch (Draft Recovery Plan).

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